

Testing Report

Customer Name: NIE-TECH Co., Ltd

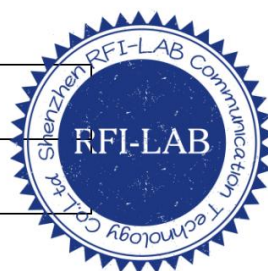
Product Name: WiFi module

Sample Model: CB2S

Reference Standard: GB/T 9410-2008; ANSI/IEEE Std 149-1979

Issue Date: 2022.10.21

Auditor: Eason	Date: 2022.10.21
Approver: Amon	Date: 2022.10.21



Version

Version No.	Date	Description	Formulate	Approval
A0	2022.10.21	For the first time, formulate	Eason	Aaron

Contents

1.General Information.....	3
1.1 General information of testing institutions.....	3
1.2 Testing principle.....	3
1.3 Test equipment.....	4
1.4 Test environment.....	4
1.5 Statement.....	4
2.Sample Information.....	5
2.1 Client information.....	5
2.2 Description of EUT(S).....	5
2.3 EUT appearance.....	6
2.4 DUT setup photo of free space OTA testing.....	6
3.Test Results.....	7
3.1 Test standard.....	7
3.2 Test uncertainty.....	7
3.3 Test data.....	7
3.3.1 Typical free space efficiency and gain.....	7
3.3.2 Typical free space radiation pattern.....	8
(The following is blank).....	9

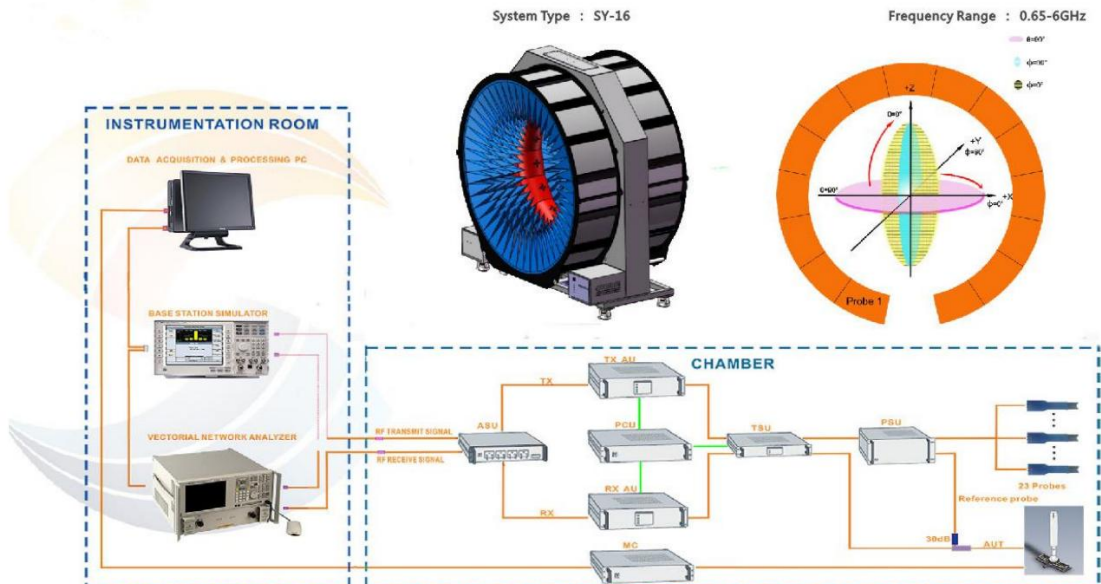
1.General Information

1.1 General information of testing institutions

Name	Shenzhen RFI-LAB Communication Technology Co., Ltd.
Address	10/F A, Lingyun Bld, Liufang Rd, Baoan District, SZ
Tel	13798473001
E-mail	lait@tech-now.com
Equipment	All the equipment used in the report is fixed in 10/F A, Lingyun Bld, Liufang Rd, Baoan District, SZ

1.2 Testing principle

Multi-Probe OTA Measurement System



1.3 Test equipment

Equipment	Model No.	Serial No.	Manufacturer	Calibration date	Next calibration date
16 probe microwave chamber	3*3*2.5	RFI-LAB-RF-A00	SUNYIELD	2021.3.15	2023.3.14
Network Analyzer	E5071C	RFI-LAB-RF-A02	Agilent	2022.5.13	2023.5.12

1.4 Test environment

Temperature	23.9℃
Humidity	59%RH
Pressure	100.12kPa

1.5 Statement

- (1) The test results in the report are only applicable to the tested samples and the tested samples work under the environment described in the report.
- (2) Only Shenzhen RFI-LAB Communication Technology Co., Ltd. have the right to modify the report, and the modification information shall be annotated in the revision form.
- (3) Any objection to this report shall be raised within 30 days after formal confirmation of the report.
- (4) This report is invalid if there is any evidence that the sample information provided is falsified.
- (5) The report is invalid without the signature of the auditor and approver.

2.Sample Information

2.1 Client information

Name	NIE-TECH Co., Ltd
Address	/
Contacts	/
Tel	/
E-mail	/
manufacturer	/

2.2 Description of EUT(S)

Product Name	WiFi module
Sample Model	CB2S
Size	/
Serial No.	/
Test Item	Antenna Gain; Efficiency; Radiation pattern
Frequency Range	2400-2500MHz
Received Date	2022.10.21
Test Date	2022.10.21
Remark	/

Figure 1 shows the PCB layout of the sensor module. The left image is a photograph of the physical PCB, which is blue and populated with various electronic components. A red rectangular box highlights the sensor area at the top of the board. The right image is a technical drawing of the sensor area, showing a zigzag pattern with various dimensions in millimeters (mm). The dimensions are as follows:

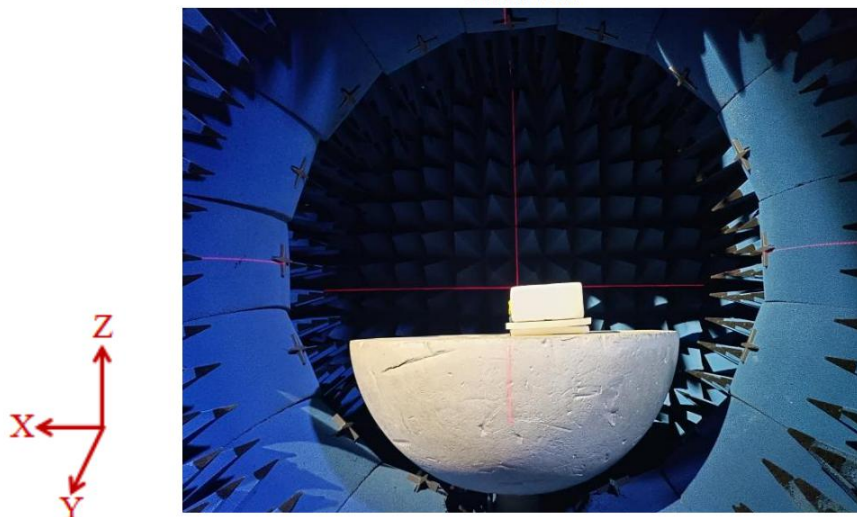
- Top horizontal segments: 13.9, 5.5, 2.7, 1.5, 2.7, 1.5
- Bottom horizontal segments: 4.9, 4.3, 3.8, 3.2, 1.5, 2.7, 2.7
- Vertical segments: 0.6, 1.5, 2.7, 4.3

单位: mm

Planform



Front view



3.Test Results

3.1 Test standard

Name	Parameter	Method	Standard no.
Mobile communication antenna	Antenna gain	Generic specification for antennas used in the mobile communications	GB/T 9410-2008
	Radiation pattern		
Antenna	Radiation efficiency	IEEE Standard Test Procedures for Antennas	ANSI/IEEE Std 149-1979
	Gain and directivity		

3.2 Test uncertainty

The uncertainty was calculated on the basis of the GUM published by ISO, using the inclusion factor of K=2 and the 95% confidence level to express the extended uncertainty.

Item	Uncertainty
Antenna gain	$\pm 1\text{dB}$
Radiation efficiency	$\pm 10\%$

3.3 Test data

3.3.1 Typical free space efficiency and gain

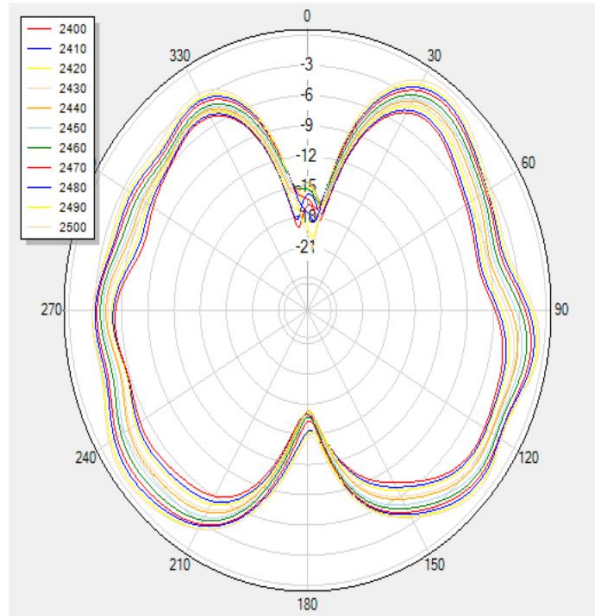
Frequency/MHz	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500
Peak Gain/dBi	-3.56	-3.32	-3.13	-2.65	-2.51	-1.97	-1.67	-1.15	-0.82	-0.51	-0.24
Efficiency/%	20.67	22.19	23.65	26.10	27.79	30.55	33.35	37.15	39.79	42.67	45.25

3.3.2 Typical free space radiation pattern

(1) 2400-2500MHz X-Z Plane:

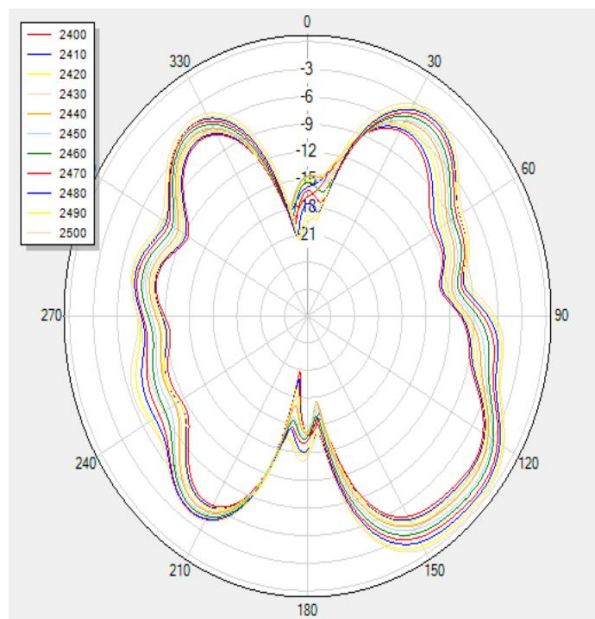
unit: dBi

V Phi=0



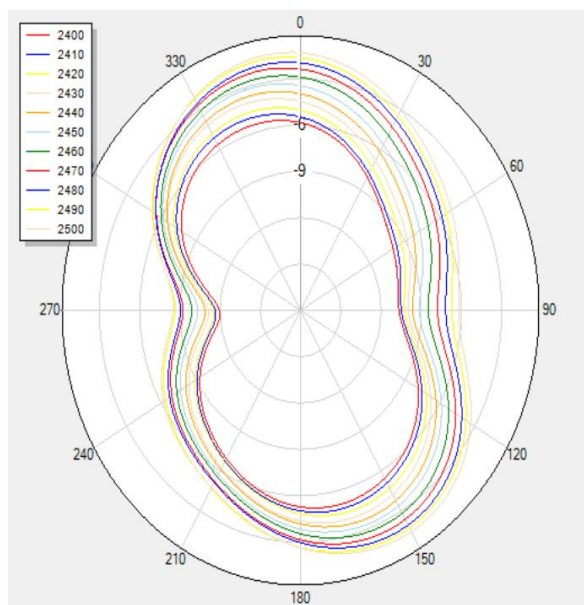
(2) 2400-2500MHz Y-Z Plane:

V Phi=90

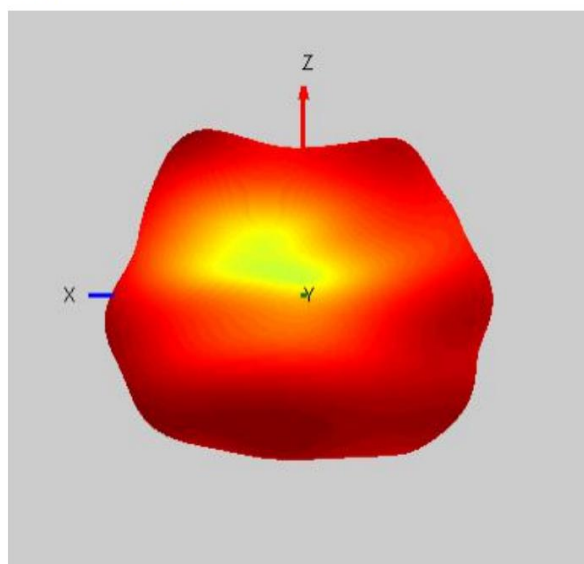


(3) 2400-2500MHz X-Y Plane:

H Theta=90



(4) Typical Free Space 3D Radiation Pattern at 2.45GHz:



-----End-----
(The following is blank)

